Cryogenic Grinding Consignment Business

Osaka Gas Liquid Group efficiently produces liquefied nitrogen by exploiting the cryogenic energy of LNG (~160°C) imported by Osaka Gas. Using above liquefied nitrogen, Osaka Gas Liquid engages in the cryogenic grinding consignment business; the Company freezes and grinds plastics and foods, which are difficult to grind at room temperature, and from this creates high-quality powder. Please contact us for more details.

Exploiting liquefied nitrogen (~196°C)
The Company conducts cryogenic grinding consignment business by optimally exploiting the cryogenic energy of liquefied nitrogen (~196°C) to produce high-quality powder.

Our customers
- Canned Chu-Hi
- Various plastics

Photo by courtesy of Suntory Spirits Limited

Grinding examples

**Foods**

<table>
<thead>
<tr>
<th>Item</th>
<th>Particle size distribution</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toasted sesame seeds</td>
<td>High quality sesame tofu and soup 180~300μm</td>
<td>Taste, flavor, and smooth texture</td>
</tr>
<tr>
<td>Pork boney and chicken bones</td>
<td>Instant soups 60~100μm</td>
<td>Very smooth texture, flavor and taste</td>
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<tr>
<td>Azuki beans</td>
<td>Pudding, ice-cream Average 25μm</td>
<td>Very smooth texture</td>
</tr>
<tr>
<td>Raisins</td>
<td>Confectionery 15~60μm</td>
<td>Sharp acidity</td>
</tr>
<tr>
<td>Hamo (tongue, gel) bones and crab legs</td>
<td>Fish cake (kamaboko) 50~150μm</td>
<td>Very smooth texture, flavor and taste</td>
</tr>
<tr>
<td>Bonito shavings and dried sardines</td>
<td>Japanese soup broth (For Udon noodles and others) 30~100μm</td>
<td>Flavor and rich taste</td>
</tr>
</tbody>
</table>

**Plastics**

<table>
<thead>
<tr>
<th>Item</th>
<th>Particle size distribution</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polypropylene</td>
<td>300~1000μm</td>
<td>Electrostatic powder coatings</td>
</tr>
<tr>
<td>Polyester</td>
<td>50~1000μm</td>
<td>Fluid-dip coatings</td>
</tr>
<tr>
<td>Polyamide</td>
<td>50~500μm</td>
<td>Coating agents</td>
</tr>
<tr>
<td>Polyacetal</td>
<td>300~1000μm</td>
<td>Plastic additives</td>
</tr>
<tr>
<td>Polyurethane</td>
<td>100~1000μm</td>
<td>Composite materials</td>
</tr>
<tr>
<td>Elastomer</td>
<td>100~1000μm</td>
<td>Hot-melt adhesives</td>
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<tr>
<td></td>
<td></td>
<td>Recycling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improved dispersibility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Industrial cleaning agents</td>
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<tr>
<td></td>
<td></td>
<td>etc.</td>
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</tbody>
</table>
Features of cryogenic grinding

1. Prevents deterioration, degradation, and oxidation of products due to grinding heat.

2. Quick water penetration and excellent water dispersion.

3. Easier grinding of oily or wet substances, which are difficult to crush at room temperature.

Five minutes after stopping agitation

Grinding at room temperature  Grindng at ultra-low temperature

Dispersion continues for a long time.

4. Enriched flavor and reduced loss of total volatile component amounts potentially caused by grinding heat.

5. Reduced torn areas (fibrous foreign materials) on fractured surfaces, which is common in grinding at room temperature.

6. Increased grinding efficiency, increased production, and eliminated bottlenecks.

7. Finer particle size than grinding at room temperature due to brittle effect.

We are ready to meet your requirements

- We are still in the research stage, so we do not have sufficient funds.
- We can offer you our small-lot, low-cost test grinding. Please contact us.
- Do you have some samples of cryogenic grinding?
- We have ground sesame seeds and ground coffee for your tasting.
- Can you grind “XXX” (specifically)?
- We have grinding results for about 800 materials and we can inform you after checking the data.
- We would like to outsource production on a one-off basis.
- We accept orders with no restrictions on quantity (from several kilograms to thousands of kilograms).

Steps to outsource cryogenic grinding

1. First meeting
2. Test processing
3. [Customer] Evaluate trial product
   - [Osaka Gas Liquid Co., Ltd.] Prepare quotation
4. Discuss about large-scale production
5. Full-scale consignment processing

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